

Abstract

The present invention discloses a ferroelectric transistor having a conductive oxide in the place of the gate dielectric. The conductive oxide gate ferroelectric transistor can have a three-layer metal/ferroelectric/metal or a two-layer metal/ferroelectric on top of the conductive oxide gate. By replacing the gate dielectric with a conductive oxide, the bottom gate of the ferroelectric layer is conductive through the conductive oxide to the silicon substrate, thus minimizing the floating gate effect. The memory retention degradation related to the leakage current associated with the charges trapped within the floating gate is eliminated. The fabrication of the ferroelectric transistor by a gate etching process or a replacement gate process is also disclosed.